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BROOKS KUSHMAN P.C. / LEAR CORPORATION
1000 TOWN CENTER
TWENTY-SECOND FLOOR
SOUTHFIELD, MI 48075-1238

EXAMINER	
AMRANY, ADI	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/709,677	BORREGO BEL ET AL.	
	Examiner	Art Unit	
	ADI AMRANY	2836	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _25 August 2008_.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _39-50_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _39-50_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _8/25/08_.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed August 25, 2008 have been fully considered but they are not persuasive.

Regarding the limitation in claim 39 directed towards measuring load impedance (Remarks, page 9), this Office Action specifically treats this limitation. It is noted that this limitation is absent from claim 46.

Applicants' remaining remarks are directed towards new independent claim 46 (incorrectly written as "45" in the Remarks). As stated in the non-final rejection (May 23, 2008), Frey discloses the architecture, including sensors to monitor the state of the system, but does not expressly disclose detecting a short circuit. Frey discloses two batteries, a converter, and an array of sensors that detects voltages in and around the converter. Frey discloses using the detected voltages to determine the state of the system (undervoltage). One skilled in the art would be able to use the Frey voltage measurements to determine any number of operating conditions. The secondary references disclose using battery measurements to specifically determine a short circuit.

The claims recite a direct connection between the input to the converter and the output of the second battery. Therefore, the converter input is identical to the second battery output, because there is only one battery inside the assembly (although there are two assemblies). The independent claims recite taking a voltage measurement twice. It would be obvious to one skilled in the art to repeat measurements, as discussed below.

Regarding Turner (Remarks, pages 12-14), applicants' arguments regarding the locations of the Turner current sensor are persuasive. The rejections over the Turner reference have been withdrawn.

Regarding Bosch (Remarks, pages 14-16), the reference clearly discloses the purpose of the system is to switch off loads due to a detected short circuit. It would be obvious to one skilled in the art that there are many ways to detect a short circuit, including using the voltage measurements of Frey. Neither reference, however, discloses sensing the battery current.

Regarding Karuppana (Remarks, page 16-18), Karuppana discloses that the module SMM disconnects the loads and determines a short circuit condition (col. 6, lines 38-52; specifically "cutting off power to one or more consumers based on a variety of programmable factors" and "providing protection against shorts"). Karuppana discloses that the module SMM performs these actions based on the inputs taken from sensors placed throughout the vehicle (col. 8, lines 9-14), including voltage and current sensors at the outputs of the power sources (fig 1D, item 19; fig 3, item 204; col. 6, lines 53-67; col. 9, lines 15-23). Frey and Karuppana combine to disclose voltage and current sensors, as well as the locations of these sensors as recited in claims 39 and 46.

Karuppana also discloses that the module SSM has a learning capability. One skilled in the art would recognize that Karuppana does not detect false short-circuits. It is also noted that none of the reference disclose any erroneous detections. Applicants'

argument that the recited method/system of claims 39 and 46 improve over the art by not detecting erroneous shorts is not persuasive.

Lastly, applicants argue that the references do not disclose that a short circuit is detected when three specific limitations are met: measured voltage exceeds a threshold, measured current exceeds a threshold and one of the DC/DC voltages exceeds a threshold. Frey discloses sensing battery and converter voltages, Karuppana discloses sensing battery voltages and currents to determine short circuits, and Bosch simply discloses means for detecting short circuits. The input parameters (voltages of the converter, voltage of the battery, and current of the battery) are disclosed by the references of record. The ability to use these parameters to determine a short circuit is also disclosed by the references. While the specific process of analyzing the data may differ, one skilled in the art would be able to use different logic or formulation to derive a short circuit status from the parameters provided by Frey, Bosch and Karuppana. Regardless, the criteria for determining a short circuit is disclosed by a Schumann (US 6,693,368).

Claim Objections

2. Claims 44 and 48-49 are objected to because there is no basis for the limitation of “the same ignition key cycle.” The claims are directed towards detecting a short circuit in a vehicle electrical system. There is no indication in any of the claims that this detection function is in any way related to where the ignition key is positioned or if it is ever removed from the ignition slot. Regardless, "ignition key cycle” is unclear and

confusing. For the purpose of the art rejection of the claim, it will be interpreted that the ignition key has not been removed from the vehicle after a short circuit was detected.

3. Claim 49 is also objected to because there is no indication in any of the previous claims that a load was responsible for creating the short circuit condition. A load is not the only component that can generate a short circuit.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 46-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey (US 6,232,674) in view of Karuppana (US 6,465,908), Bosch (WO 01/21445) and Schumann (US 6,693,368).

Method claims 39-45 correspond to apparatus claims 46-50. The apparatus claims will be treated first.

With respect to claim 46, Frey discloses a system for protecting against short circuit in electric power distribution architecture (fig 1; col. 2, lines 41-45) having a first battery assembly for generating a first voltage level (item 16; col. 2, lines 45-60), a second battery assembly for generating a second voltage level that is substantially higher than the first voltage level (18; col. 4, lines 17-29), a converter coupled between

the first and second battery assemblies (item 13), and at least one power distribution unit (item 17), the system comprising:

a module SMM (items 11-12; col. 2, line 61 to col. 3, line 21) operably coupled to:

the converter having an input coupled to the second battery assembly (KL 30a) and an output coupled to the first battery assembly (KL 30), wherein the converter is adapted to generate a first voltage signal (input to port 28) indicative of an amount of voltage measured at the output and to generate a second voltage signal (input to port 27) indicative of an amount of voltage measured at the input; and

at least one power distribution unit operable coupled to at least one load (col. 2, lines 51-57);

wherein the module SMM is configured to:

compare the first voltage signal to a first predetermined range (col. 3, lines 25-53);

compare the second voltage signal to a second predetermined range (col. 3, lines 25-53);

measure a voltage across a first battery (only one battery) within the first battery assembly (equal to voltage input to converter); and

control the PDU to disconnect all loads in response to the module SMM determined that the measured voltage is output of predetermined parameters

(col. 4, lines 31-47); wherein the module SMM avoids detecting the presence of an erroneous event.

Frey does not expressly disclose sensing battery current, and does not disclose the combination of converter voltages, battery voltage and battery current to detect a short circuit. This is because Frey discloses that the system is already protected against short circuits (abstract).

Karuppana discloses an electric power distribution architecture (fig 1C, 2A; col. 4, lines 55-57; col. 5, lines 23-35), comprising: a battery (fig 2A, item 102; col. 7, line 57 to col. 8, line 4), a module SMM (fig 1C, item 10; fig 2A, item 100; col. 5, lines 36-49; col. 6, lines 3-12; col. 8, lines 5-65), at least one power distribution unit coupled to at least one load (103-110), wherein the module SMM is configured to:

measure voltage and current across a first battery (fig 1D, item 19; fig 3, item 204; col. 6, lines 12-20 and 53-67; col. 9, lines 15-23) and

control the PDU to disconnect the loads in response to the module SMM determining the presence of a short circuit condition in the architecture (col. 6, lines 12-20, 38-52);

wherein the parameters ensure that the module SMM avoids detecting the presence of an erroneous short circuit (col. 4, lines 55-57; col. 6, lines 38-52).

Bosch discloses a dual-battery system comprising means to switch off loads at risk in the event of a detected short circuit (abstract). Bosch does not expressly disclose the combination of voltage/current parameters that are used to determine the short circuit.

Frey, Karuppana and Bosch are analogous because they are from the same field of endeavor, namely battery control systems. At the time of the invention by applicants, it would have been obvious to combine the commonly known vehicle architecture disclosed in Frey with the short circuit detection modules disclosed in Karuppana and Bosch in order to more accurately determine the battery status (Karuppana; col. 1, lines 36-43) and protect the loads from a battery failure (Bosch, abstract, lines 3-5).

The references do not expressly disclose the combination of measurements that is used to determine the presence of a short circuit. Karuppana discloses that battery voltage and current are necessary components. Schumann discloses that short circuits are determined based on a high voltage value of one of the vehicle batteries and high current across the battery (col. 1, line 30 to col. 2, line 56). As discussed above, the second battery output voltage <u>is the same</u> as the converter input voltage (there are no intervening components). Since Schumann discloses measuring battery output voltage, one skilled in the art would recognize that Schumann is also measuring converter input voltage as well.

Frey, Karuppana, Bosch and Schumann are analogous because they are from the same field of endeavor, namely battery control systems. At the time of the invention by applicants, it would have been obvious to combine the measured parameters disclosed in Frey, Karuppana and Bosch with the short circuit detection criteria disclosed in Schumann in order to increase reliability of correct short circuit detection (Schumann, col. 2, lines 6-9).

With respect to claim 47, Frey discloses that the module SMM is coupled to the second battery assembly (fig 1) and the module is further adapted to control the second battery assembly to disconnect itself (col. 4, lines 48-54) in response to determining that the measured input parameter does not meet a predetermined threshold. As discussed above, Karuppana and Bosch disclose that the sensed voltages and currents can be used to determine a short circuit. Frey discloses that the loads are connected in parallel to the first battery (items 16, 17). By disconnecting the two batteries from each other (control device 10a), Frey inherently disconnects the second battery from the load (17).

With respect to claim 48, it would be obvious to one skilled in the art that the Frey system reconnects the loads when the emergency operation is over (col. 4, lines 55-67). Frey, Karuppana, Bosch and Schumann all continuously measure battery parameters (voltage and current) to detect the next emergency or short-circuit. It is obvious that the references will continue to measure the battery parameters after at least one load is reconnected.

6. Claims 49-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frey in view of Karuppana, Bosch, Schumann and Pittel (US 5,801,913).

With respect to claim 49, the references cited above do not expressly disclose the procedure for reconnecting loads. Pittel discloses the relationship between sensed load impedance and short circuits (col. 1, lines 21-65). Frey, Karuppana, Bosch, Schumann and Pittel are analogous because they are from the same field of endeavor, namely electrical protection systems. At the time of the invention by applicants, it would have been obvious to combine the load disconnect disclosed above with the load

reconnect criteria disclosed in Pittel in order to allow the vehicle operator to resume using the vehicle after the short circuit event has passed.

With respect to claim 50, Pittel discloses disconnecting a load if its measured impedance value indicates a short circuit (col. 1, lines 31-38).

With respect to claim 39, Frey, Karuppana, Bosch, Schumann and Pittel disclose the apparatus necessary to complete the recited method, as discussed above in the rejections of claims 46 and 49. As discussed above, claim 39 only differs from claim 46 by the addition of a limitation directed towards measuring load impedance.

With respect to claim 40, Frey (col. 4, lines 41-47) and Bosch (fig, items S1 and S2) disclose the loads are disconnected via a power switch.

With respect to claims 41 and 43, Pittel discloses measuring load impedance to determine short circuit conditions. It would be obvious to one skilled in the art that the load is connected to the output of the switch (the power sources are connected to the input), such that the load impedance can be accurately measured at the switch or at the load itself.

With respect to claim 42, as discussed above, Frey and Bosch disclose switches to disconnect the loads. It would be obvious to one skilled in the art that these switches would be used to reconnect the loads as well.

With respect to claim 44, it would be obvious to one skilled in the art that the short circuit detection, the load disconnect and the load reconnect can all occur within the same ignition key cycle. There is no maximum time limit for the length of an ignition

key cycle. One skilled in the art would be able to design a short circuit even which would occur and correct itself before the user removed the ignition key.

With respect to claim 45, as discussed above, none of the references disclose a problem with detecting erroneous short circuits. Karuppana further discloses an improved system (col. 4, lines 55-57) that includes learning capability (col. 6, lines 38-52). The ability to better detect a short circuit is interpreted as an inherent result of increasing the number of criteria that must be met to trigger a short circuit event. The criteria are met by the references, as discussed above in the rejection of claim 46.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ADI AMRANY whose telephone number is (571)272-0415. The examiner can normally be reached on Mon-Thurs, from 10am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on (571) 272-2800 x36. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

AA

/Stephen W Jackson/
Primary Examiner, Art Unit 2836